lower elevation than the existing surrounding ground. After the machine is removed, and any necessary backfill is applied, the plant shall be thoroughly watered and mulched, then staked as shown on the Plans.

231.05. METHOD OF MEASUREMENT.

Live and healthy plants in satisfactory condition will be measured by each category, and the quantities to be paid for under this item will be the number of each kind of (A) *Trees,* (B) *Shrubs,* (C) *Vines* or *ground covers,* and (D) *Trees machine planted.*

231.06. BASIS OF PAYMENT.

Accepted planting, measured as provided above, will be paid for at the contract unit price as follows:

(A)	TREES (KIND)	EACH
(B)	SHRUBS (KIND)	EACH
(C)	VINES OR GROUND COVERS (KIND)	EACH
(D)	TREES MACHINE PLANTED (KIND)	EACH
(E)	ESTABLISHMENT PERIOD	EACH

Such payment shall be full compensation for furnishing replacement trees, material, equipment, labor and all incidentals to complete the work as specified.

SECTION 232
SEEDING

232.01. DESCRIPTION.

This work shall consist of seedbed preparation, and furnishing and planting seeds in accordance with these Specifications and in reasonably close conformity with the areas and locations shown on the Plans or established by the Engineer. It includes seeding for permanent erosion control and seeding for the temporary erosion control.

232.02. MATERIALS.

Materials shall meet the requirements specified in the following Subsections of Section 700 Materials.

Seed	735.04
Fertilizer	735.07

Water shall be free from harmful quantities of toxic salts or other substances that might interfere with the establishment and growth of turf.

232.03. EQUIPMENT.

Furnish equipment in satisfactory working condition, and in sufficient quantity to perform the work as specified. Have the equipment on the project site and approved by the Engineer before beginning work on the corresponding item.

(a) **Hydraulic Seeder.**

(1) This equipment shall be factory designed and built with sufficient pump capacity to apply specified quantities. The tank shall hold a minimum of 1000 gallons (4 kiloliters) and be equipped with a mechanical agitation system with an operating capacity sufficient to suspend and homogeneously mix the seed and water. The distribution hoses shall be large enough to prevent clogging and be equipped with spray nozzles that will provide even distribution on designated areas.

(2) The equipment shall be mounted on a traveling unit which may be either self-propelled or pulled, capable of getting the tank and nozzles within sufficient proximity of the area to be seeded without the wheels operating on the areas to be seeded.

(b) **Grass Seed Drill.** The drill shall be an approved native grass seed drill, which shall be equipped with two separate planter boxes and planting mechanisms which will plant large chaffy seed and fine clean seed simultaneously. The drill shall be equipped with a mechanism for accurately adjusting the rate of seed flow, and with double-disk openers designed to open furrows on 8 inch (200 mm) or-less centers, with each disk having a depth regulating band 1 inch (25 mm) from the disk edge. Each furrow opener shall be equipped with heavy press wheels to firm the soil behind the opener and leave the seed covered to an average depth of 1/2 to 3/4 inches (12 to 19 mm).

(c) **Corrugated Roller Seeder.** The seeder shall be equipped with corrugated roller wheels mounted on tandem axles. The roller wheels shall be spaced on approximately 2 inches (50 mm) centers and shall place the seed at a depth of 1/4 to 1/2 inch (6 to 12 mm). The seeder shall be equipped with two separate planter boxes and planting mechanisms, which will plant clean, fine seed and large, chaffy seed simultaneously. The seeder shall also be equipped with a mechanism for accurately adjusting the rate of seed flow and weigh approximately 125 to 250 pounds per linear foot (186 to 372 kg. per meter) of rolling width.

(d) **General.** Rolling, fertilizing, and watering equipment shall meet the requirements of Subsection 108.06.

232.04. CONSTRUCTION METHODS.

(a) **Seedbed Preparation.**

(1) To prepare areas to be seeded, fill, reshape eroded areas, clean ditches, and refinish slopes and medians to the established typical grading sections. Mow all live plants.

(2) Completely incorporate thick layers of previously applied mulching materials or residues of vegetation into the soil by disking, unless otherwise directed. Till soil on the contour to a depth of 4 inch (100 mm). Crush and pack all clods larger than 1 inch (25 mm) in diameter. The tillage consists of disking, harrowing, and rolling. Where necessary, apply water.

(3) When hydraulic seeding is specified, leave or make the seedbed surface sufficiently rough before seeding.

(b) **Planting Methods.** Plant all seed uniformly at the specified rate. When several species are specified and cannot be combined due to different characteristics—such as size, weight, or being hulled or unhulled—plant the seed separately to obtain the specified seeding rate.

(1) Seeding Method A - Hydraulic Seeder Method. Place the seed in water in the spray tank of a hydraulic seeder conforming to Subsection 232.03(a). Distribute the seed uniformly by power spraying through a suitable nozzle. If specified, place inoculant for legumes in the spray tank with the seed in accordance with approved methods. When seed is loaded into 1000 gallons (3.8 kiloliters) of water in the spray tank, do not exceed the quantity specified for 2 acres (0.80 hectares). If less than 1000 gallons (3.8 kiloliters) of water is used, reduce (1) the amount of seed, (2) other specified materials, and (3) the area seeded per load in proportion to the water. When seed and fertilizer are to be distributed as a water slurry, apply the mixture to the area to be seeded within 30 minutes after all components have been placed in the equipment.

(2) Seeding Method B - Grass Seed Drill Method. Plant seed with a grass seed drill conforming to Subsection 232.03(b). Carry out all drilling on the approximate contour lines.

(3) Seeding Method C - Corrugated Roller Seeder Method. Distribute the seed with a corrugated roller seeder conforming to Subsection 232.03(c) that has been adjusted to accurately apply the specified quantities. On slope, planting shall be along the approximate contour lines.

(4) Hand Broadcasting Method. Use hand broadcasting only in areas that are too small or inaccessible to accommodate the specified equipment.

(c) **Planting Season and Weather Restrictions.** Erosion control operations shall be in accordance with Subsection 230.04(f).

(d) **Soil Moisture and Watering Requirements.**

(1) Soil moisture shall exist throughout the zone from 1 inch (25 mm) to at least 5 inches (125 mm) below the surface at the time of planting. The required moisture content of the soil may be estimated and judged closely by the hand squeeze test. The soil should readily form a tight cast when squeezed in the hand. The cast should break into two pieces without crumbling and without leaving excess water on the hand after casting.

(2) Water the areas to be seeded if called for on the Plans or determined by the Engineer.

(e) **Fertilizer Application.** Fertilizer application shall be in accordance with Section 234.

(f) **Repairs and Maintenance.** The Contractor shall be responsible for repairs and maintenance of areas designated for seeding until all work on the Contract or designated portion thereof has been completed and approved for final acceptance.

(1) Repair. This work shall include the restoration of all eroded areas to the approximate typical grading section shown on the Plans or as determined by the Engineer. Repair includes seeding, fertilizing, and watering damaged areas, which shall be performed during the specified planting season.

(2) Maintenance. This work shall consist of weed control by mowing, hand cutting, herbicides, or other approved methods. Weed growth on sodded areas shall be removed as often as determined by the Engineer. If herbicides are necessary, use them in accordance with label instructions and only with prior approval from the Engineer. Mowing shall be in accordance with Section 241.

232.05. METHOD OF MEASUREMENT.

Seeding will be measured by the acre (hectare).

NOTE: Work and material used in repair of seeding will not be measured for payment.

Watering will be measured by the kiloliters of water. The method of measurement is in accordance with section 230.05. Water used as a carrier for seed in hydraulic seeding operations is considered subsidiary to "seeding" and will not be measured for payment.

Fertilizer will be measured and paid for in accordance with Section 234.

Mowing will be measured and paid for in accordance with Section 241.

232.06. BASIS OF PAYMENT.

Accepted seeding, measured as provided above, will be paid for at the contract unit price bid for as follows:

(A) SEEDING METHOD A ..... ACRE (HECTARE)
(B) SEEDING METHOD B ..... ACRE (HECTARE)
(C) SEEDING METHOD C ..... .ACRE (HECTARE)
(D) WATERING ..... M-GAL (KILOLITER)

Such payment shall be full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

SECTION 233
MULCHING

233.01. DESCRIPTION.

This work shall consist of furnishing, applying, and fastening mulching materials on the soil surface in accordance with these Specifications and in reasonably close conformity with the areas and locations shown on the Plans or established by the Engineer.

233.02. MATERIALS.

Materials shall meet the requirements specified in the following Subsections of Section 700 Materials. These materials can be used either as a temporary protective item or as a protective mulch for seeded, sodded, or planted areas.

Vegetative Mulch	735.05(a)
Asphalt Mulch	735.05(b)
Excelsior Mat	735.05(c)
Jute Mesh	735.05(d)
Excelsior Mulch	735.05(e)
Wood Cellulose Fiber	735.05(f)
Nylon Erosion Control Mat	735.05(g)
Mulch Fasteners	735.06